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## Perspective

## The energy crises revealed by COVID: Intersections of Indigeneity, inequity, and health



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## ABSTRACT

The global COVID-19 pandemic is a health crisis, an economic crisis, and a justice crisis. It also brings to light multiple ongoing, underlying social crises. The COVID-19 crisis is actively revealing crises of energy sovereignty in at least four ways. First, there are many whose access to basic health services is compromised because of the lack of energy services necessary to provide these services. Second, some people are more vulnerable to COVID-19 because of exposure to environmental pollution associated with energy production. Third, energy services are vital to human wellbeing, yet access to energy services is largely organized as a consumer good. The loss of stable income precipitated by COVID-19 may therefore mean that many lose reliable access to essential energy services. Fourth, the COVID-19 crisis has created a window of opportunity for corporate interests to engage in aggressive pursuit of energy agendas that perpetuate carbon intensive and corporate controlled energy systems, which illuminates the ongoing procedural injustices of energy decision making. These four related crises demonstrate why energy sovereignty is essential for a just energy future. Energy sovereignty is defined as the right for communities, rather than corporate interests, to control access to and decision making regarding the sources, scales, and forms of ownership characterizing access to energy services. Energy sovereignty is a critical component in the design of a post-COVID-19 energy system that is capable of being resilient to future shocks without exacerbating injustices that are killing the most vulnerable among us.

## 1. Introduction

Energy provides the ability to meet essential human needs. Humans do not need energy as an end in itself, but use energy for the services it provides, like lighting, thermal comfort, the ability to store food and medicine, and myriad others [1,2]. Access to these energy services is most typically provided as a consumer good, meaning that people can access energy to the extent that they can pay for it. The concept of energy sovereignty incorporates the rights to self-determination, which are both legal and inherent rights held by individuals and communities, to make decisions about the sources, scales, and forms of ownership and access that characterize the energy systems used to provide energy

services [3,4].

This essay argues that the current COVID-19 pandemic - itself a public health, economic, and justice crisis - illuminates and compounds existing crises in energy sovereignty. While recognizing these crises are global in scale, this essay largely focuses on North America, with several examples from Tribal Nations and from Michigan, USA to illustrate the broader points. The essay is a collaboration among scholars currently studying energy transitions specifically in rural and Tribal Nations contexts, and the discussion draws from this focus. The essay aims to reveal the consequences of having an energy system structured by enormous power differentials and fundamentally contradictory motivations - making profit while providing an essential public service.

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We argue for the need to design energy systems that enhance energy sovereignty, whereby communities can exercise the right of community-scale self-determination to make informed decisions around energy choices, that take into account the consequences of these choices for health and wellbeing on an intergenerational timescale. The COVID-19 crisis is shedding light on already existing vulnerabilities associated with a lack of energy sovereignty; this essay discusses these crises and presents two policy recommendations for addressing them.

## 2. Crisis 1: Global access inequity

Existing scholarship in energy justice has highlighted global inequities in access to basic energy services [5], which are being exposed and exacerbated by the COVID-19 crisis [6]. People in many parts of the world lack access to the most basic energy services, including electricity for refrigeration, operation of water supply pumps, and medical services. When COVID-19 emerges in these areas, there is diminished capacity to rely on, for example, even the lowest-cost open source ventilators for healthcare support [7] because the electrical energy services necessary to provide these ventilators is insufficient or does not exist [8]. In many cases, these regions of the world have suffered centuries of colonialist exploitation, including exploitative extraction of source materials to provide for energy services for others [9], in ways that are clearly characterized by a lack of energy sovereignty on the part of the local populations [10].

North America is no exception to access inequity. Take, for example, Native American communities who have suffered centuries of colonization and extraction of energy resources, yet remain inadequately supplied with energy services, perhaps none more so than the Navajo Nation. Oil discoveries 100 years ago in Dinétah (Navajo homeland) led to US-imposed governmental structures and the “federal recognition” model subsequently imposed on 574 tribes, to enable corporations to strike deals with native people under US law [11]. Now, after 100 years, some 100,000 people - a third of the Navajo Nation - still have no running water [12] and 15,000 of their 50,000 households live without electricity [13,14]. Coal, oil, natural gas, and uranium have all been extracted in Dinétah and shipped away, or burned in the Four Corners coal-fired electricity generating stations to power Phoenix, AZ. Coal power emissions increase premature death, premature birth, low birthweight, and heart and lung diseases [15]. Navajo coal has produced power in Navajo country since 1973 and power transmission lines march across the 27,000 square mile reservation, yet hogans (Navajo homes) are still without power [16]. Navajo citizens, residents of the region where the power plants were built, suffer the health impacts of electricity production without reaping its benefits.

In this context of ongoing energy injustice, COVID-19 has further devastated the community [17]. As of May 12th, the Navajo Nation has more cases per capita than any state in the U.S. [18], with just four hospitals serving 175,000 residents. Navajo patients are being sent to Phoenix, Flagstaff, and Santa Fe, some 250–280 road miles away, for hospital treatment [19–20]. There are compounding health problems; not just those associated with coal, but also diabetes, and increases in kidney disease and cancer from generations of living next to approximately 500 abandoned uranium mines [21]. Despite having provided energy in every form to the outside society, the citizens of Dinétah suffer energy poverty due to their history of exploitation. Now, their lack of electricity and water for sanitation, combined with the health impacts from generations of exposure to coal and uranium emissions has left them extremely vulnerable to COVID-19.

## 3. Crisis 2: Environmental injustice

A second crisis of energy sovereignty revealed by the crisis of COVID-19 relates to the environmental injustices associated with inequitable exposure to environmental pollution caused by energy systems. These environmental impacts are not trivial. For example, coal-

fired air pollution is responsible for roughly 52,000 premature American deaths each year [22] and a recent study found that over 26,000 American lives were saved in a ten-year period with reduced reliance on coal [23].

Marginalized communities bear the brunt of such air pollution impacts due to inequities in property valuation and availability of affordable housing [24], and the COVID-19 crisis has vividly demonstrated that the externalities being absorbed by low income individuals include vulnerability to pandemic fatality [24,25]. A recent study of more than 4000 COVID-19 deaths in Europe shows that almost 80% of those deaths were from five regions with high levels of ambient nitrogen dioxide pollution [26], which is produced in incomplete combustion of fossil fuels including electricity generating plants and automobiles [27]. Burning fossil fuel results in contaminated land, water, and food systems [28,29,30] as well as negative health impacts embodied in vulnerable populations through increased rates of heart and lung diseases and asthma, all risk factors for detrimental outcomes in the current COVID-19 crisis [31].

In the U.S., people who are poor, Black, Latinx, and/or Indigenous are much more likely to be facing severe negative health consequences and vulnerabilities in the face of the COVID-19 crisis [32,33,34]. COVID-19 associated death rates are twice as high for people who are Black and Latinx compared to people who are white in New York City [35]. Conditions such as diabetes and poor respiratory health, both potential consequences of environmental injustice, are more common among the poor and among racial and ethnic minorities. Historical and contemporary lack of energy sovereignty means that most people, but especially those in socially vulnerable, disenfranchised, or oppressed groups, have not been given the right to decide what energy systems they use and what associated impacts on their communities they are willing to accept. Without the ability to make decisions, these populations face exacerbated negative health outcomes [36]. These are compounded by inequities in access to health care [37] and by discriminatory behavior in the healthcare system [38]. The lack of energy sovereignty – the inability of people from poor and marginalized groups to make decisions about the energy systems they use and the impacts of energy systems they are willing to accept – is precipitated by a lack of social justice or social power. This power imbalance is responsible for the inequitable distribution of adverse health outcomes associated with energy systems and is now compounded by the COVID-19 crisis.

## 4. Crisis 3: Essential service provided as consumer good

In the context of the current COVID-19 pandemic, people across the world are facing a loss of access to income, which means a reduction in their ability to pay for access to energy services. Across the United States, utility customers have seen a patchwork of shutoff protections from their states’ leadership [39]. Many governors have issued emergency orders suspending disconnections from natural gas, electricity, and water services during the pandemic, and some have also suspended service interruptions for cable and internet [40]. In Michigan, the Administrative Procedures Act (MCL 24.248) gives state agencies the power to issue emergency rules without notice to preserve public health, safety, and welfare. However, Gov. Whitmer and the Michigan Public Service Commission (MPSC) chose not to issue a moratorium on electric and gas shutoffs or order reconnections for customers whose service was suspended prior to the COVID-19 emergency. This is despite the fact that Michigan’s “Stay Home, Stay Safe” executive order, which forces the closure of non-essential businesses and limits social contact, is among the most restrictive in the nation [41]. As of May 27th, Michigan had the fourth-highest number of COVID-19-related deaths in the U.S and is one of 18 states with a stay-at-home/shelter-in-place order in effect through June 12, with only 12 states having such orders in place for the same amount of time or longer. The epicenter of the pandemic in the state is the city of Detroit, which as the tenth largest city in the US, has the sixth-highest number of individuals living in

poverty [42]. Even for the fortunate individuals who have been able to maintain employment during the pandemic, there has been a shift in shouldering the burden of energy expenses for work from companies to individuals (e.g., electricity for computers and telecommunication equipment, movement of light manufacturing to their homes, and fuel for personal automobiles for delivery of products; [43]).

At all times, but particularly during a pandemic, survival of the most vulnerable often depends on their ability to control the temperature in their homes, use an air conditioner to ease respiratory stress with air circulation, refrigerate medicine, store and prepare food, and operate medical equipment. Increased deaths due to the 2003 blackout clearly demonstrate the vulnerabilities of a sudden disruption to energy services [44]. Michigan residents have been ordered to stay home to “flatten the curve,” but they are not guaranteed that home will be a safe and comfortable place in which to shelter. The MPSC has placed the onus on consumers to seek means for delaying or financing their energy needs during the pandemic and has trusted public utilities to work with these consumers to do so [45,46,47]. This may not be sufficient to ensure that the poorest and most marginalized Michigan residents are able to meet their energy needs during the pandemic.

The Governor of Michigan has, through numerous actions, demonstrated that she understands the urgency and severity of the crisis. Yet in not issuing a moratorium, her administration has failed to take the one step that could protect customers from shutoff. The reluctance may stem in part from the fact that there is no mechanism in statute to protect ratepayers from the aftermath of a moratorium order. Standard ratemaking practice treats uncollectible accounts as a rate-based expense; it is assumed that, under ordinary circumstances, a percentage of customers will be unable or unwilling to pay their bills. Bad debt is factored into customer rates to allow utilities to recover the full cost of providing service. Further, many utilities are reporting decreasing energy demands during implemented stay-at-home orders ranging from 4% to as much as 18% [48,49], representing a loss in revenue from current energy usage. In Wisconsin, a state where the governor did declare a shutoff moratorium, regulated utilities have already requested that the Wisconsin Public Service Commission allow them to recover debt and reconnection fees - with a rate of return - in future rate cases [50]. This represents a primary energy justice issue as those with assets (i.e. utility stock owners) will earn a guaranteed return on investment [51,52,53] for a large sum of money specifically because of the COVID-19 related inability of the poor (or temporarily poor) to pay electric bills.

In 2018, the Energy Information Administration found that 31% of American households had trouble paying their energy bills, in an economy that was, by most conventional measures, doing well [54]. Without widespread adoption of consumer-friendly policies like debt forgiveness and utility rates geared to income, working families will struggle to catch up on utility debt long after the crisis wanes. The temporary restrictions on shutting off access to energy or charging for energy services are likely to compound future economic injustices, as these debts will continue to burden customers long after the COVID-19 crisis and during what is widely anticipated to be a dramatic economic recession. Thus, in states that issue shutoff moratoria and in those that do not, long-term energy injustices will be compounded in different ways.

#### 5. Crisis 4: Usurping the regulatory process

Fourth, the COVID-19 pandemic has created an opportunity for powerful energy interests to usurp the regulatory process. One example is the permitting process for Enbridge's fuel pipeline that runs from Superior, Wisconsin to Sarnia, Ontario, through Michigan and underneath the Straits of Mackinac, called Line 5. Enbridge is taking advantage of divided public attention and a fraught financial situation during the COVID-19 crisis to push forward permit applications for a major change to the pipeline siting, plans to drill a tunnel under the

Straits of Mackinac. In April 2020, Enbridge submitted a large docket of these applications and supporting technical documentation to multiple agencies in the state of Michigan responsible for approving permits [55].

Tribal Nations have expressed concern over the continued operation of Enbridge Line 5 since at least 2015 [56] and have demanded repeatedly that its operations be shut down, given the age of the infrastructure (built in 1953) and the threats it poses to Great Lakes aquatic and shoreline environments, fishing communities, and tourism [57]. Tribal Nations in Michigan had hoped that Michigan's current Whitmer administration would treat Tribes fairly by considering their shared responsibility for the resources impacted by Line 5 under two negotiated Consent Decrees [58]. However, the reduced attention given to the Enbridge permitting process during a major public health crisis may not allow the Tribes to get a fair hearing.

All permits carry statutory time limits for review by the government agencies and public comment periods. These permit processes present a case study of procedural energy injustice [2]. The tribes are sovereign nations with treaty-retained rights to hunt, fish, and gather throughout the territory ceded to the United States. Yet the state of Michigan controls decision making regarding a serious threat to those rights, and its processes do not provide the tribes an appropriate role for a sovereign nation. The treaties are between the tribes and the United States and one even predates the existence of the state of Michigan, but in its federal legal structure, the U.S. has delegated authorities under the Clean Water Act and other federal statutes to the state and only protects tribal sovereign rights through limited delegations of authorities to the tribes [59].

The COVID crisis and its limitations on tribal capacity to participate in permitting processes points out the ongoing injustice of having one jurisdiction making these decisions for all sovereigns. The siting case before the Michigan Public Service Commission (MPSC) is a particularly egregious example. The Commission's process of quasi-judicial contested case decision making requires that interested parties apply for intervenor status, a process that requires legal representation, and should it be approved, requires extensive staff and legal time to prepare testimony, call expert witnesses, and participate in cross-examination. Intervenor status must be prepared to expend significant funds to be heard. Public comment and tribal consultation do not form part of the record of proceedings, so while these opportunities exist, they are filtered through staff reports and are not subject to cross examination, so their influence on decision making is limited.

The COVID-19 crisis has precipitated a fiscal crisis for Tribal nations, in the Great Lakes region [60] and across the U.S. [61]. Revenue-generating enterprises such as tribal casinos are shuttered for safety. Tribal governments do not have taxation as a revenue source. Tribal leadership and staff are fully engaged in crisis management, working to retain essential services, obtain federal assistance, and retain staff levels to the extent possible. While requiring “pay to play” through allowing intervenor status while state agencies are still controlling decisions has always been an example of a procedural injustice in cases where tribal governments hold retained rights in treaties to manage affected resources; the current COVID-19 crisis points this out in stark relief. The injustice existed before the COVID-19 crisis; the crisis magnifies it.

A partial solution to this injustice involves intervenor funding. In numerous jurisdictions, including Canada's federal government and several provinces (British Columbia, Alberta, Manitoba, and Ontario) [62,63], intervenor funding has been recognized as an important mechanism to provide for public participation, offer information and testimony not available elsewhere, and result in cost savings to the proponent during implementation of permitted infrastructure development [64,65,66]. While costs are sometimes awarded after the conclusion of proceedings in environmental regulatory cases, to date the United States has not embraced the intervenor funding model of providing necessary financial resources in advance of environmental law hearings. This model would allow Tribes to participate equitably in the



energy infrastructure permitting process, including during a financial and public health crisis that reduces their resources and personnel.

Quasi-judicial hearing processes such as the Michigan Public Service Commission's siting procedure are carried out in the public interest. While the public has a right to present their views at these hearings, the cost of participating inhibits that participation and can make that right meaningless, especially in times of financial and social strain such as the current COVID-19 pandemic. At the same time, public interest intervention often provides the only critical analysis of a proponent's evidence that a hearing panel may have to consider [67,68]. By leveling the field for technical and legal support, intervenor funding programs can be designed to address the ongoing injustices of the hearing and decision process, which the conditions of pandemic have laid bare, to increase community capacity for energy sovereignty.

## 6. Conclusions

Representative Alexandria Ocasio-Cortez, the youngest woman ever elected to the U.S. Congress, was recently interviewed about the ongoing crisis in her district (the hardest hit in America) and across the country; "This crisis is not really creating new problems," she said. "It's pouring gasoline on our existing ones" [69]. Energy systems fundamentally impact wellbeing, from the health impacts and environmental damage caused by fossil fuel exploration and combustion, to the ability to access the lifesaving services provided by energy. The COVID-19 crisis is compounding existing crises in energy sovereignty, as communities experience firsthand the impacts of relying on energy systems that are organized by profit motives and outside community control. As communities grapple with how to protect public health and recover from the economic impacts of the pandemic, they can also contend with the crises of energy sovereignty in ways that enhance wellbeing for all present and future beings through reimagining and reorganizing access to energy services and the kinds of energy services that are organized for the public good.

The crises of energy sovereignty revealed by the COVID-19 crisis illustrate the inherent contradiction involved in having for-profit entities responsible for providing a service essential to human life and wellbeing. Given the inherent tension in the existing model for energy services provision, we suggest two potential policy changes that could enhance the potential for communities to navigate the impacts of COVID-19 while simultaneously enhancing energy sovereignty. First, states can issue executive orders to prevent electricity shutoffs during this and future times of acute economic crisis, while instituting debt-forgiveness and utility rates geared to income. Second, widespread adoption of intervenor funding for quasi-judicial energy reviews held in the public interest would allow communities to intervene in energy decision making in ways that enhance both sovereignty and justice. The four crises detailed here all existed before COVID-19 and will continue to exist when the pandemic crisis wanes; finding ways to address them may improve our collective ability to navigate future crises as well as reach a just sustainable state.

## Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

## References

- [1] R.E. Smalley, Our Energy Challenge. A Lecture at the James A. Baker III Institute for Public Policy of Rice University. 2005, Accessed 12 May 2020. [https://www.bakerinstitute.org/media/files/Research/3cf8b6ec/NANO\\_Smalleylecture.pdf](https://www.bakerinstitute.org/media/files/Research/3cf8b6ec/NANO_Smalleylecture.pdf).
- [2] B.K. Sovacool, R.V. Sidortsov, B.R. Jones, *Energy Security, Equality and Justice*. Routledge, 2013.
- [3] M. Laldjebaev, B.K. Sovacool, *Energy security, poverty, and sovereignty: complex interlinkages and compelling implications*, Routledge, 2015, pp. 121–136.
- [4] D.E. Powell, The Rainbow Is Our Sovereignty: Rethinking the Politics of Energy on the Navajo Nation, *J. Polit. Ecol.* 22 (1) (2015) 53.
- [5] B.K. Sovacool, M.H. Dworkin, *Global energy justice*, Cambridge University Press, 2014.
- [6] V.C. Broto, L. Stevens, E. Ackom, J. Tomei, P. Parikh, I. Bisaga, L.S. To, J. Kirschner, Y. Mulugetta, A research agenda for a people-centred approach to energy access in the urbanizing global south, *Nat. Energy* 2 (2017) 776–779, <https://doi.org/10.1038/s41560-017-0007-x>.
- [7] J.M. Pearce, A review of open source ventilators for COVID-19 and future pandemics. *F1000Research*, 2020, 9(218), p.218. Doi: 10.12688/f1000research.22942.2.
- [8] World Economic Forum (WEF). 2020. Here's why energy security is a vital tool in tackling a pandemic. April 6. Accessed 12 May 2020. <https://www.weforum.org/agenda/2020/04/pandemic-energy-access-coronavirus/>.
- [9] Dunn, Aimee Cree. 201 Accessed 29 May 2020. <https://www.counterpunch.org/2019/11/06/an-open-letter-to-climate-activists-in-the-northwoods-and-beyond/>.
- [10] S. Coll, Private Empire: ExxonMobil and American power. Penguin, 2012.
- [11] J.P. Thompson, How oil and greed led to the 1923 centralization of Navajo government. 2016, December 21. Accessed 12 May 2020. <https://riveroflostsouls.com/2016/12/21/how-oil-and-greed-led-to-the-1923-centralization-of-navajo-government/>.
- [12] F.S. Sellers, It's almost 2020, and 2 million Americans still don't have running water, according to new report. 2019, December 11. Accessed 12 May 2020. [https://www.washingtonpost.com/national/its-almost-2020-and-2-million-americans-still-dont-have-running-water-new-report-says/2019/12/10/a0720e8a-14b3-11ea-a659-7d69641c6ff7\\_story.html](https://www.washingtonpost.com/national/its-almost-2020-and-2-million-americans-still-dont-have-running-water-new-report-says/2019/12/10/a0720e8a-14b3-11ea-a659-7d69641c6ff7_story.html).
- [13] American Public Power Association. N.d. Light up the Navajo Nation. Accessed 29 May 2020. <https://www.publicpower.org/LightUpNavajo>.
- [14] Morales, L. 2019. For Many Navajos, Getting Hooked Up To The Power Grid Can Be Life-Changing. May 2019. Accessed 12 May 2020. <https://www.npr.org/sections/health-shots/2019/05/29/726615238/for-many-navajos-getting-hooked-up-to-the-power-grid-can-be-life-changing>.
- [15] P. Aleshire, Coal Plant Health Effects. 2019, December 24. Accessed 12 May 2020. [https://www.wmicentral.com/news/latest\\_news/coal-plant-health-effects/article\\_0005eaf8-2ed3-5f27-8af6-65749a439e7a.html](https://www.wmicentral.com/news/latest_news/coal-plant-health-effects/article_0005eaf8-2ed3-5f27-8af6-65749a439e7a.html).
- [16] D.E. Powell, *Landscapes of Power: Politics of energy in the Navajo Nation*, Duke University Press, Durham and London, 2018.
- [17] K. Lee, No running water. No electricity. On Navajo Nation, coronavirus creates worry and confusion as cases surge. *LA Times* 2020, March 29. Accessed 12 May 2020. <https://www.latimes.com/world-nation/story/2020-03-29/no-running-water-no-electricity-in-navajo-nation-coronavirus-creates-worry-and-confusion-as-cases-surge>.
- [18] R. Klar, Navajo Nation reports more coronavirus cases per capita than any US state. *The Hill* May 11. 2020, Accessed 12 May 2020. <https://thehill.com/policy/healthcare/497091-navajo-nation-has-more-coronavirus-cases-per-capita-than-any-us-state>.
- [19] K. Abou-Sabe, C. McFadden, C. Romo, J. Longoria, NBC News 20 2020, April 2020 <https://www.nbcnews.com/health/health-news/coronavirus-batters-navajo-nation-it-s-about-get-worse-n1187501>.
- [20] M. Chacon, Technical Reviewer/Quality Assurance Manager at Pueblo de San Ildefonso, Santa Fe, NM. Personal Communication. 2020, 15 May 2020.
- [21] EPA, Navajo Nation: Cleaning up Abandoned Water Mines, Accessed 12 May 2020. <https://www.epa.gov/navajo-nation-uranium-cleanup/cleaning-abandoned-uranium-mines>.
- [22] E.W. Prehoda, J.M. Pearce, Potential lives saved by replacing coal with solar photovoltaic electricity production in the US, *Renew. Sustain. Energy Rev.* 80 (2017) 710–715, <https://doi.org/10.1016/j.rser.2017.04.094>.
- [23] J.A. Burney, The downstream air pollution impacts of the transition from coal to natural gas in the United States, *Nat. Sustainability* 3 (2020) 152–160, <https://doi.org/10.1038/s41893-019-0453-5>.
- [24] E. Alcalá, P. Brown, J.A. Capitman, M. Gonzalez, R. Cisneros, Cumulative Impact of Environmental Pollution and Population Vulnerability on Pediatric Asthma Hospitalizations: A Multilevel Analysis of CalEnviroScreen, *Int. J. Environ. Res. Public Health* 16 (2019) 2683.
- [25] B. Israel, Deaconess Medical Center Report: Stark disparities in COVID-19 hospitalization and death rates among New York: Low-income and minority communities shoulder disproportionate burden of COVID-19. 2020. *ScienceDaily* April 29. Accessed 9 May 2020. <https://www.sciencedaily.com/releases/2020/04/20200429134011.htm>.
- [26] Rishi K. Wadhwa, Priya Wadhwa, Prakriti Gaba, Jose F. Figueroa, Karen E. Joynt Maddox, Robert W. Yeh, Changyu Shen. Variation in COVID-19 Hospitalizations and Deaths Across New York City Boroughs. *JAMA* 2020; DOI: 10.1001/jama.2020.7197X.
- [27] Yaron Ogen, Assessing nitrogen dioxide (NO<sub>2</sub>) levels as a contributing factor to coronavirus (COVID-19) fatality, *Sci. Total Environ.* 726 (2020) 138605, <https://doi.org/10.1016/j.scitotenv.2020.138605>.
- [28] L. Friedman, New Research Links Air Pollution to Higher Coronavirus Death Rates. 2020. April 17. Accessed 9 May 2020. <https://www.nytimes.com/2020/04/07/climate/air-pollution-coronavirus-covid.html>.
- [29] V.S. Gagnon, Ojibwe Gichigami ("Ojibwa's Great Sea"): an intersecting history of treaty rights, tribal fish harvesting, and toxic risk in Keweenaw Bay, United States, *Water History* 8 (2016) 365–384, <https://doi.org/10.1007/s12685-016-0185-7>.
- [30] D.J. Ranco, C.A. O'Neill, J. Donatuto, B.L. Harper, Environmental justice, American Indians and the cultural dilemma: Developing environmental management for tribal health and well-being, *Environ. Justice* 4 (4) (2011) 221–230, <https://doi.org/10.1089/env.2010.0036>.

- [31] J. Vickery, L.M. Hunter, Native Americans: where in environmental justice research? *Soc. Nat. Resour.* 29 (1) (2016) 36–52, <https://doi.org/10.1080/08941920.2015.1045644>.
- [32] Center for Disease Control (CDC), Information for Healthcare Professionals: COVID-19 and Underlying Conditions, Accessed 9 May 2020. <https://www.cdc.gov/coronavirus/2019-ncov/hcp/underlying-conditions.html>.
- [33] H. Kauer, The coronavirus pandemic is hitting black and brown Americans especially hard on all fronts. 2020, May 8. Accessed 12 May 2020. <https://www.cnn.com/2020/05/08/us/coronavirus-pandemic-race-impact-trnd/index.html>.
- [34] L. Mineo, For Native Americans, COVID-19 is 'the worst of both worlds at the same time.' 2020, April 18. Accessed 12 May 2020. <https://news.harvard.edu/gazette/story/2020/05/the-impact-of-covid-19-on-native-american-communities/>.
- [35] M. Singh, M. Koran, 'The virus doesn't discriminate but governments do': Latinos disproportionately hit by coronavirus. 2020, April 18. Accessed 12 May 2020. <https://www.theguardian.com/us-news/2020/apr/18/the-virus-doesnt-discriminate-but-governments-do-latinos-disproportionately-hit-by-coronavirus>.
- [36] J.C. Mays, A. Newman, Virus Is Twice as Deadly for Black and Latino People Than Whites in N.Y.C 2020 Times New York Accessed 29 May 2020. <https://www.nytimes.com/2020/04/08/nyregion/coronavirus-race-deaths.html>.
- [37] D. Hernández, E. Siegel, Energy insecurity and its ill health effects: a community perspective on the energy-health nexus in New York City, *Energy Res. Social Sci.* 47 (2019) 78–83.
- [38] National Indian Health Board (NIHB), COVID-19 Recovery Legislative Proposal (Phase #4) April 8, 2020, Accessed 9 May 2020. [https://www.nihb.org/covid-19/wp-content/uploads/2020/04/FINAL\\_HOUSE\\_ATTACHMENT-1\\_NIHB\\_Phase-4-Tribal-Healthcare-Public-Health-Priorities.pdf](https://www.nihb.org/covid-19/wp-content/uploads/2020/04/FINAL_HOUSE_ATTACHMENT-1_NIHB_Phase-4-Tribal-Healthcare-Public-Health-Priorities.pdf).
- [39] Z.D. Bailey, N. Krieger, M. Agénor, J. Graves, N. Linos, M.T. Bassett, Structural racism and health inequities in the USA: evidence and interventions, *The Lancet* 389 (10077) (2017) 1453–1463.
- [40] National Association of Regulatory Utility Commissioners (NARUC), COVID 19 News and Resources State Response Tracker, Accessed 9 May 2020. <https://www.naruc.org/compilation-of-covid-19-news-resources/state-response-tracker/>.
- [41] L. Levine, 2020. Governors: Safe, Clean Water Is Essential in COVID-19 Crisis. Natural Resource Defense Council. 8 April 2020, updated 20 May 2020. <https://www.nrdc.org/experts/larry-levine/governors-safe-clean-water-essential-covid-19-crisis>.
- [42] J. Capehart, 'We really are on our own here' in fight against coronavirus, says Michigan governor. 2020, April 27. Accessed 9 May 2020. <https://www.washingtonpost.com/opinions/2020/04/27/we-really-are-our-own-here-fight-against-coronavirus-says-michigan-governor/>.
- [43] J. Metzger, K. Booza 2002. Poverty in the United States, Michigan and Metropolitan Detroit: An Analysis of Census 2000. Center for Urban Studies - July 2002 Working Paper Series, No. 9. Accessed 8 June 2020 [http://www.cus.wayne.edu/media/1383/working\\_paper9.pdf](http://www.cus.wayne.edu/media/1383/working_paper9.pdf).
- [44] N. Manes, Consumers, DTE show Declines in Business Energy Use and Rising Home Use amid Covid-19. 2020, April 28. Accessed 9 May 2020. <https://www.craigslist.com/energy/consumers-dte-show-declines-business-energy-use-rising-home-use-amid-covid-19>.
- [45] B.G. Anderson, M.L. Bell, Lights Out: Impact of the August 2003 Power Outage on Mortality in New York, NY, *Epidemiology* 23 (2) (2012) 189–193.
- [46] Michigan Public Service Commission. 2020a. State leaders outline protections, assistance available for energy utility customers. March 6th. Accessed 9 May 2020. <https://www.michigan.gov/mpsc/0,9535,7-395-93253,93280-523342-,00.html>.
- [47] Michigan Public Service Commission. 2020b. MPSC Outlines Steps to Ensure Utility Protections, Assistance for Vulnerable Households Amid COVID-19 Pandemic. April 15th. Access 9 May 2020. <https://www.michigan.gov/mpsc/0,9535,7-395-93253,93280-525926-,00.html>.
- [48] DTE. 2020. DTE Energy launches new Personalized Service Protection program to help customers impacted by COVID-19 protect their energy service. April 21st. Accessed 9 May 2020. <https://skriff.meltwater.io/site/5e12ac481b7-bea03e16a9079/article/5e9ee915e5e3cb001b5aa664>.
- [49] L.D. Paulson, 2020. COVID-19 Impacts on Energy Demand, Infrastructure Yet to Be Known. April 17th. Accessed 9 May 2020. [https://www.newsdata.com/california\\_energy\\_markets/regional\\_roundup/covid-19-impacts-on-energy-demand-infrastructure-yet-to-be-known/article.81af8834-80f0-11ea-8ae6-07cc0191c46e.html](https://www.newsdata.com/california_energy_markets/regional_roundup/covid-19-impacts-on-energy-demand-infrastructure-yet-to-be-known/article.81af8834-80f0-11ea-8ae6-07cc0191c46e.html).
- [50] D. Proctor, 2020. NYISO: Power Consumption Down as Much as 18%. April 16th. Accessed 9 May 2020. <https://www.powermag.com/nyiso-power-consumption-down-as-much-as-18/>.
- [51] C. Hubbuch, 2020. Wisconsin regulators approve COVID-19 pandemic cost recovery for investor-owned utilities. April 17. Accessed 9 May 2020. <https://madison.com/wsj/business/wisconsin-regulators-approve-covid-19-pandemic-cost-recovery-for-investor-owned-utilities/article.0da986b5-b5a0-5920-bef5-46fb53949509.html>.
- [52] H. Gray, The Passing of the Public Utility Concept, *J. Land Public Utility Econom.* 16 (1) (1940) 8–20, <https://doi.org/10.2307/3158751>.
- [53] D. Roberts, Power utilities are built for the 20th century. That's why they're flailing in the 21st. 2015, September 9. Accessed 13 May 2020. <https://www.vox.com/2015/9/9/9287719/utilities-monopoly>.
- [54] J.C. Ogg, 15 basic economy dividend stocks you'll want to own after the coronavirus recession. 2020, April 16. Accessed 9 May 2020. <https://www.usatoday.com/story/money/personalfinance/2020/04/16/15-basic-economy-dividend-stocks-every-investor-will-want-to-own-after-the-covid-19-recession/111547404/>.
- [55] S. Ingber, 31 Percent Of U.S. Households Have Trouble Paying Energy Bills. 2018, September 19. Accessed 9 May 2020. <https://www.npr.org/2018/09/19/649633468/31-percent-of-u-s-households-have-trouble-paying-energy-bills>.
- [56] MPSC. 2020c. MPSC establishes comment period on Enbridge Energy's application for Line 5 tunnel project in Straits of Mackinac. April 23. Accessed 12 May 2020. <https://electricenergyonline.com/article/energy/category/oil-gas/89/829823/mpsc-establishes-comment-period-on-enbridge-energy-s-application-for-line-5-tunnel-project-in-straits-of-mackinac.html>.
- [57] Payment, A. 2015. Resolution 2015-45 of the Sault Ste. Marie Tribe of Chippewa Indians: Resolution in Support of Decommissioning of the Enbridge Line 5 Oil Pipeline at the Straits of Mackinac. Accessed 12 May 2020. <https://d3n8a8-pro7vhm.cloudfront.net/oilandwaterdontmix/pages/723/attachments/original/1456555541/Line-5-Sault-Tribe-Resolution.pdf?1456555541>.
- [58] LeBlanc, B. 2019. Michigan tribes consider lawsuit to prevent Line 5's 'unacceptable risk.' August 26. Accessed 12 May 2020. <https://www.detroitnews.com/story/news/local/michigan/2019/08/26/michigan-tribes-consider-suit-prevent-line-5-s-unacceptable-risk/2088360001/>.
- [59] R.A. Enslin, 2000. Consent Decree Case No. 2:73 CV 26, Hon. Richard Alan Enslin. Accessed 12 May 2020. [https://www.michigan.gov/documents/dnr/consent\\_decree\\_2000\\_197687\\_7.pdf](https://www.michigan.gov/documents/dnr/consent_decree_2000_197687_7.pdf).
- [60] S. Diver, D. Ahrens, T. Arbit, K. Bakker, Engaging Colonial Entanglements: "Treatment as a State" Policy for Indigenous Water Co-Governance, *Global Environmental Politics* 19 (3) (2019) 33–56.
- [61] K. Lafond, Tribes face COVID-19 with limited test kits, remote staff, lost revenue. 2020, March 28. Accessed 12 May 2020. <https://www.michiganradio.org/post/tribes-face-covid-19-limited-test-kits-remote-staff-lost-revenue-0>.
- [62] Marshall, J. 2020. Tribal Nations — Highly Vulnerable to COVID-19 — Need More Federal Relief. Center on Budget and Policy Priorities, April 1. Accessed 12 May 2020. <https://www.cbpp.org/blog/tribal-nations-highly-vulnerable-to-covid-19-need-more-federal-relief>.
- [63] Anon Intervenor Funding and Access to Environmental Justice: Time for the Ontario Political Parties to revisit this issue? Iler Campbell LLP August 2011 Accessed 5 May 2020 [www.ilercampbell.com/blog/wp-content/uploads/Intervenor-Funding-and-Participation.pdf](http://www.ilercampbell.com/blog/wp-content/uploads/Intervenor-Funding-and-Participation.pdf).
- [64] A. Lesperance, Key Elements of a Participant Funding Program for BC's Environmental Assessment Act. 2019, March 26. Accessed 5 May 2020 <http://www.elc.uvic.ca/wordpress/wp-content/uploads/2019/06/BRIEFING-NOTE-Participant-Funding-in-EA.pdf>.
- [65] M.I. Jeffery, D. Estrin, Role of Intervenor Funding in Project Approval, *Int. Business Lawyer* 14 (1986) 371.
- [66] M.I. Jeffery, Intervenor Funding as the Key to Effective Citizen Participation in Environmental Decision-Making, *Arizona J. Int. Comparat. Law* 19 (2) (2002) 35.
- [67] Jeffery, M. I. 2005. Environmental Governance: A comparative analysis of public participation and access to justice. *J. South Pacific Law* 9(2) Retrieved May 5, 2020, from <http://www3.pacilii.org/journals/fJSPL/vol09no2/2.shtml>.
- [68] R. Anand, I.G. Scott, Financing Public Participation in Environmental Decision Making, *Canad. Bar Rev.* 60 (1) (1982).
- [69] M. Leibovich, For A.O.C., 'Existential Crises' as Her District Becomes the Coronavirus Epicenter. May 4. 2020, Accessed 12 May 2020. <https://www.nytimes.com/2020/05/04/us/politics/coronavirus-alexandria-ocasio-cortez.html>.